

First record of the relict Gondwanan genus *Homalocnemis* Philippi (Diptera: Empididae) from Namibia and the Afrotropical Region

by

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ABSTRACT

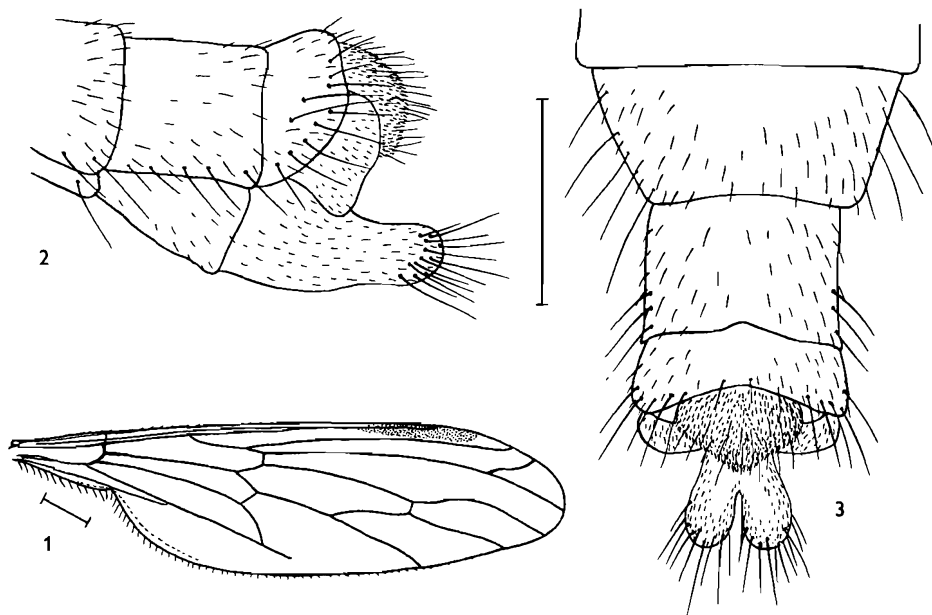
Homalocnemis namibiensis (subfamily Brachystomatinae) is described from a single female collected near Swakopmund in Namibia. *Homalocnemis* Philippi is recorded from the Afrotropical Region for the first time, previously known only from southern Chile and New Zealand. The Gondwanan origin of *Homalocnemis* and the phylogeny of the few Recent relict species are discussed.

INTRODUCTION

The genus *Homalocnemis* was erected by Philippi in 1865 for the new Chilean species *H. nigripennis*. Since 1865 a further five species have been described, some in the genera *Fraudator* Hutton (a synonym of *Homalocnemis*) and *Brachystoma* Meigen. Collin (1933) described a second Chilean species, *H. prae-sumpta*, and four species were described from New Zealand between 1901 and 1932.

Homalocnemis has long been considered to be a primitive empidid genus of uncertain systematic position, placed either in the Brachystomatinae (eg. Melander 1928), in its own subfamily Homalocneminae (eg. Collin 1928), or in the Hybotinae (eg. Collin 1933, Smith 1967). *Homalocnemis* and *Brachystoma* are unique within the Empididae in having very plesiomorphic wing venation, with a very long anal cell of *Hybos*-type (see Fig. 1), this also present within the superfamily Empidoidea in the relict family Atelestidae. Recent phylogenetic studies have shown that *Homalocnemis* shares many synapomorphies with *Brachystoma* (eg. the similar structure of the male genitalia and the long basal segment of the antennal style), and *Homalocnemis* is now placed in the subfamily Brachystomatinae of the restricted family Empididae (Chvála 1983).

Homalocnemis also has a distinctive geographical distribution, up to now known only from Chile and New Zealand. The same applies to *Ceratomerus* Philippi, 1865 (Empididae, Ceratomerinae), known still from three Chilean and ten New Zealand and Tasmanian species. These distributions strongly suggest a close relationship between the South Chile/Patagonia fauna, and that of New Zealand and Tasmania. It was consequently most surprising when a single female of a *Homalocnemis* species was collected on the margin of the Namibian desert by Dr Brian R. Stuckenberg. The specimen was taken at the blossom of *Arthroa leubnitziae* (Kuntze) Schinz (*Amaranthaceae*) on a sandy littoral plain near Swakopmund.



Figs 1-3. *Homalocnemis namibiensis* sp. n., holotype ♀. 1. Wing. 2-3. Postabdomen. 2. Lateral. 3. Dorsal. Scale lines = 0,5 mm.

I am indebted to Dr Stuckenberg for the opportunity to study this species and am grateful to him for information provided concerning the biotope and on the origin and history of the South African fauna. I am also indebted to Mr J. Chainey of the British Museum (Natural History), London, for the loan of the female allotype of the Chilean *Homalocnemis praesumpta* Collin.

TAXONOMY

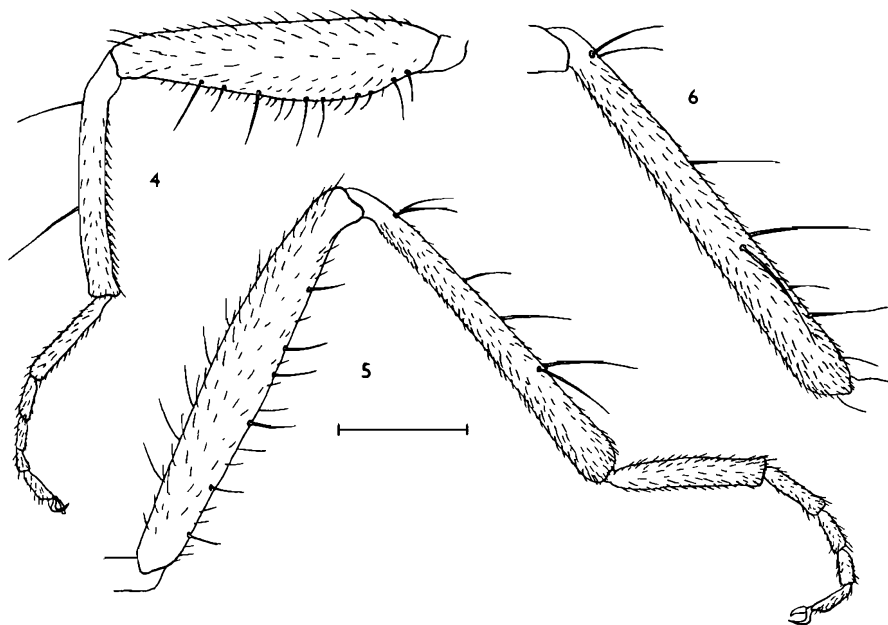
Homalocnemis namibiensis sp. n.

Figs 1-5

Diagnosis: Superficially similar to *H. praesumpta* (female allotype examined), but *praesumpta* distinguished by larger body size (body length 6,6 mm, wing length 6,5 mm), only 2 pairs of equally developed but longer and stronger ocellar bristles, longer and stronger apicoventral bristles on second antennal segment, larger ommatidia on upper half of eyes (twice as long as those below in *praesumpta* and 1,5 times in *namibiensis*), longer humeral hairs and at least 16 scutellar marginal bristles. In addition, the hind tibia of *praesumpta* has a different complement of dorsal bristles (see Fig. 6), the abdominal terga (basal 2 excepted) have black bristles laterally with at least 2 distinct black bristles laterally on each tergum.

Male: Unknown.

Female: Dimensions: Body length 4,5 mm; wing length 5,0 mm.



Figs 4–6. *Homalocnemis* species. 4–5. *H. namibiensis* sp. n., holotype ♀. 4. Mid leg, posterior view. 5. Hind leg, anterior view. 6. *H. praesumpta* Collin, allotype ♀, hind tibia, anterior view. Scale lines = 0,5 mm.

Head: Eyes bare, touching above for a long distance, leaving only minute triangular frons above antennae. Ommatidia on smaller upper half (anteriorly at about the level of antennae) considerably enlarged. Ocellar swelling triangular and very convex, with 2 pairs of rather strong black ocellar bristles about as long as antennal style, anterior pair slightly longer and an additional minute pair of posterolateral hair-like bristles (posterior to strong hind pair). Occiput densely brown-grey dusted, although upper margin around ocellar tubercle somewhat subshining in some lights; upper occipital margins with dense black bristly hairs, slightly shorter and much weaker than anterior ocellar bristles. Postocular margin with row of similarly long, but distinctly forwardly curved black bristly hairs. Lower part of head and ventral base of proboscis with numerous long white hairs. Antennae black, positioned at about middle of head in profile; basal segments small, broadly connected and almost equally short, segment 2 with tuft of black pre-apical bristly hairs; segment 3 long, distinctly stouter on basal third than on narrowed apical two-thirds, stouter basal section about as long as both basal segments combined. Style about as stout as apical section of third antennal segment and subequal in length to entire segment; basal segment distinctly longer than deep, extreme tip of style very narrow and bristle-like. Proboscis horizontal, not exceeding front of head in profile; rather stout, apically with short dark pubescence. Palpi black, long and cylindrical, closely attached above to equally long proboscis, and covered mostly with black bristly hairs which are longer and more numerous apically, and several long pale ventral hairs basally.

Thorax: Distinctly humped or arched above, almost bare except for rather small marginal bristles and several prominent scutellar bristles; large bristles black. Mesonotum rather velvety black when viewed from above, except for small grey ovate patch in prescutellar depression, grey scutellum, inner margin of postalar calli, and conspicuously coppery-brown dusted prothorax. Anteriorly, mesonotum rather thinly brown dusted. Thoracic pleura and coxae uniformly light grey dusted, similar to notopleural depression and pronotum (the latter in side view only). Humeri with about 10 fine dark hairs becoming paler or at least brown in some positions, no bristles differentiated; similar hairs also on postalar calli. Notopleural depression with 4 black bristles; 4 pairs of somewhat weaker dorsocentral bristles anterior to scutellum (bordering grey prescutellar patch). Scutellum with 13 strong black marginal bristles (16–20 in *praesumpta*). Lower sides of prosternum and prothoracic episterna with small pale hairs, precoxal bridge not developed, although prosternum fairly large. Prothoracic spiracle velvety black.

Wing: Brown, stigma elongate and deeply blackish brown, veins black. Venation as in Fig. 1, very similar to that of *praesumpta*. Axillary lobe slightly developed, squamae dark with long pale fringes. Halteres dark brown.

Legs: Rather thinly dark brown-grey dusted, except extreme tips of femora and tibiae almost shining black. Coxae grey, concolorous with pleura, covered with dense pale hairs. Fore and hind femora subequal in length and slender, basal half of fore femora slightly stouter, basally as stout as cylindrical hind femora. Mid femora (Fig. 4) distinctly shorter and stouter, on basal half about twice as deep as hind femora, slightly narrowed apically. Fore femora with short dorsal appressed hairs, except for some longer bristly hairs posterodorsally and ventrally a double row of black spine-like bristles becoming longer apically, those in posterior row longer and apically slightly longer than femur is deep. Mid femora with similar bristling, but also with double row of short stubby spines between ventral rows of bristles. Hind femora dorsally with several black bristly hairs, those at about middle the longest, ventrally with double row of distinctly diverging stronger bristles. Fore tibiae with strong anterodorsal bristle at base and ventrally with 2 rows of minute stubby spines, except basally; microscopic brown pile between rows of spines. Mid tibiae (Fig. 4) slightly shorter but equally slender, with additional strong anterodorsal bristle in basal half. Hind tibiae (Fig. 5) slender and only slightly stouter apically, ventrally with minute pubescence, but dorsally with 6 strong black bristles becoming longer apically; a pair of antero- and posterodorsal bristles at base, 3 dorsal bristles on mid-third and another anterior bristle forming a diverging pair with the last (longest) dorsal bristle in apical third. Tarsi slender, except for slightly stouter cylindrical hind metatarsus; all segments covered with short appressed hairs, terminal circlets inconspicuous.

Abdomen: Dull dark brown above, slightly subshining in other views, sterna rather grey-black and more subshining, but broad pleural membrane very dull and lighter grey. Dorsum practically bare, with scattered and barely visible pale microscopic hairs, lateral margins of terga with 5–6 long white hairs; lateral hairs stronger and black on tergum 7, tergum 8 with row of long black bristles along

posterior margin, surrounding finely pale pubescent median lobe. Sternum 8 prolonged into apically bilobed terminal projection, each with tuft of black bristles at tip (Figs 2 & 3).

Material examined: Holotype ♀, NAMIBIA: 10 km S. Swakopmund, on Walvis Bay road, 10.vii.1988, B. R. Stuckenberg, flowering succulents on sandy plain. In Natal Museum, Pietermaritzburg (NM Type No. 322).

Discussion: According to Stuckenberg (*pers. comm.*), the succulent *Arthraerua leubnitziae* was the only flowering plant at the type locality of *H. namibiensis*, growing on a flat windswept sandy plain about 400 m inland from the beach, at the edge of the Namib desert. The plants trap wind-blown sand and constantly grow upwards, eventually being elevated on sandy mounds. They provide the only available (although small) nectar-rich flowers in the region. As far as I know, all members of the Brachystomatinae are predaceous on other insects. Although the biology of *Homalocnemis* species remains unknown, the new species may not be an obligate nectar feeder, as nectar-feeding can serve as an additional source of liquid nutrients for species occurring in dry biotopes. This is a fairly common habit in other predaceous Empididae.

Species of *Homalocnemis* and *Ceratomerus* have been cited as good examples of insects showing a close relationship between the South American and New Zealand faunas, i.e. flies of Palaeotropical origin inhabiting tropical and subtropical biotopes of the original Neogea and Notogea respectively. Such a discontinuous distribution clearly indicates the very old Gondwanan origin of these flies, though they are usually now absent in South Africa. The main reason for this seems to be the considerably colder climate of the South African temperate zone. Stuckenberg (*pers. comm.*) gives an explanation of the surprising recent discovery of *Homalocnemis* in Namibia: "there have been some curious discoveries of primitive insects in Namibia in recent years that suggest that aridification from the Miocene onwards may have imposed extraordinary selective pressures on an old fauna of mesic-adapted insects". Further new examples of the old Palaeotropical fauna may possibly be found in Namibia during future entomological investigations.

There is no doubt that *Homalocnemis* is of Gondwanan origin. Since Africa, South America and New Zealand separated during the Upper Cretaceous, the *Homalocnemis* species should have been well differentiated by the Lower Cretaceous. In the diagram of the presumed phylogeny of the Empidoidea (Chvála 1983, Fig. 140) the Mesozoic branching of separate empidid evolutionary lines is shown, indicating the already independent brachystomatine line separated from the common empidid-oreogetonine line somewhere between the Jurassic and Cretaceous. *Homalocnemis* undoubtedly represents a relict group within the Empididae, almost unaltered since the Upper Cretaceous. The very similar and closely related Recent species *praesumpta* (Chile) and *namibiensis* (Namibia) confirm this premise.

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